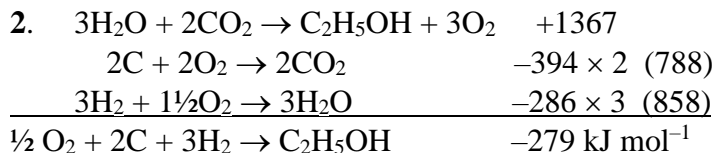
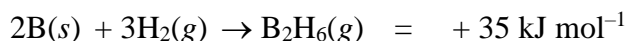
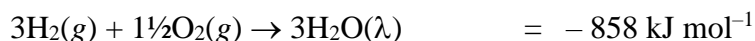
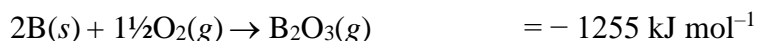
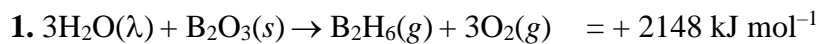
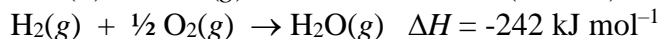
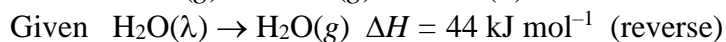
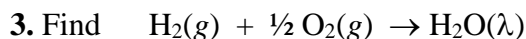


ANSWERS: Enthalpy change calculations



The enthalpy change would be more positive.

Heat energy is absorbed when converting a liquid to a gas. Therefore if the ethanol formed were in the gaseous state, less energy would be released in its formation / products would have a higher enthalpy.



$\Delta_f H^\circ(\text{H}_2\text{O}(\lambda)) = -44 + (-242) = -286 \text{ kJ mol}^{-1}$

4. $M(\text{NH}_3) = 17 \text{ g/mol}$

$n = \frac{m}{M} = \frac{50}{17} = 2.94 \text{ mol}$

when 4 mol of NH_3 reacts, 1267kJ released

so when 2.94 mol reacts, $\frac{1267 \times 2.94}{4} = 931.6 = 932\text{kJ}$ released (3 sig figs)

5. $M_r(\text{HBr}) = 80.9$

$n(\text{HBr}) = \frac{m}{M} = \frac{50.0 \hat{\text{g}}}{80.9 \hat{\text{g}} \text{mol}^{-1}} = 0.618 \text{ mol}$

$\text{heat}(50.0 \text{ g HBr}) = n\Delta_f H^\circ(\text{HBr})$

$= 0.618 \text{ mol} \times 36.2 \text{ kJ mol}^{-1}$

$= 22.4 \text{ kJ}$

6. $\Delta_{\text{vap}} H^\circ(\text{H}_2\text{O}) = \Delta_f H^\circ(\text{H}_2\text{O}, g) - \Delta_f H^\circ(\text{H}_2\text{O}, \lambda) = -241 - (-286) = 45 \text{ kJ mol}^{-1}$

$M(\text{H}_2\text{O}) = 18 \text{ g mol}^{-1}$

Heat required to vaporise 100 g water $= 45/18 \times 100$

$= 250 \text{ kJ}$